

# High-Pressure Fittings

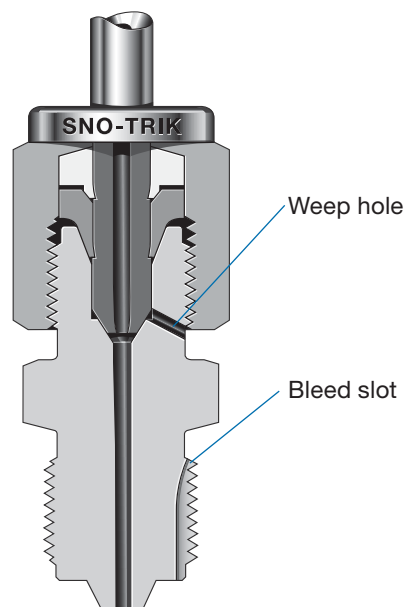


## Features

- Pressures to 60 000 psi (4134 bar)
- Weep holes for instant leak detection

## Features

- Fittings are machined from 316 stainless steel.
- Back ferrule is manufactured from S17400 hardened stainless steel to ensure a secure grip on hardened or annealed tubing.
- Weep holes allow instant leak detection.
- Unique ferrule action helps prevent excessive deformation of the seal area of tube end and body.
- Fitting does not reduce tube wall thickness.
- Fittings can be made, disconnected, and remade easily to provide a reliable leak-tight seal.
- Bleed slot on male thread connectors facilitates purging of fluid before operation.



## Pressure Ratings

### High-Pressure Fitting

- The rating for high-pressure tube fittings and threaded connectors is determined with Swagelok® hardened tubing at room temperature.
- The rating for high-pressure tube fittings and threaded connectors with annealed tubing is 30 000 psig (2067 bar) at room temperature.

### Pipe Fitting

- Pipe thread pressure rating is based on laboratory testing with both male and female threads manufactured by Swagelok Company.

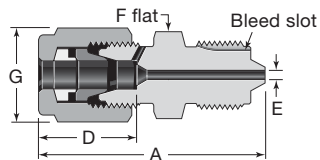
## Materials of Construction

Component	Material
Back ferrule	S17400 SS
All other components	316 SS

## Ordering Information and Dimensions

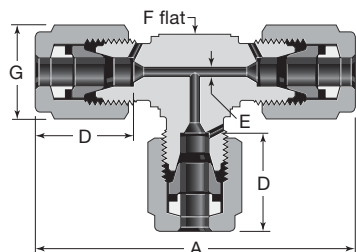
Dimensions are for reference only and are subject to change.

### High-Pressure Tube Fitting to High-Pressure Male Thread Connectors



Tube OD in.	Uniform Thread Size	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
			A	D	E	F	G	
1/4	9/16-18	SS-440-1-44M	1.96 (49.8)	0.82 (20.8)	0.09 (2.3)	5/8	3/4	60 000 (4134)
	3/4-16	SS-440-1-64M	2.32 (58.9)			13/16		
3/8	9/16-18	SS-640-1-44M	2.24 (56.9)	1.04 (26.4)	0.09 (2.3)	13/16	15/16	
	3/4-16	SS-640-1-64M	2.41 (61.2)					
9/16	3/4-16	SS-940-1-64M	3.01 (76.5)	1.45 (36.8)	0.12 (3.0)	1 1/4	1 3/8	
	1 1/8-12	SS-940-1-94M	3.19 (81.0)					

### Union Tees

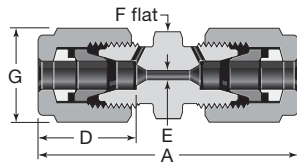


Tube OD in.	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
		A	D	E	F	G	
1/4	SS-440-3	2.78 (70.6)	0.82 (20.8)	0.09 (2.3)	11/16	3/4	60 000 (4134)
3/8	SS-640-3	3.48 (88.4)	1.04 (26.4)	0.12 (3.0)	7/8	15/16	
9/16	SS-940-3	5.04 (128)	1.45 (36.8)	0.19 (4.8)	1 1/4	1 3/8	

## Ordering Information and Dimensions

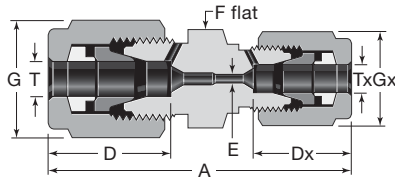
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### Unions



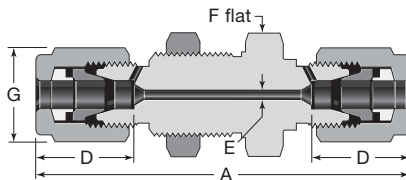
Tube OD in.	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
		A	D	E	F	G	
1/4	SS-440-6	2.25 (57.2)	0.82 (20.8)	0.09 (2.3)	5/8	3/4	60 000 (4134)
3/8	SS-640-6	2.70 (68.6)	1.04 (26.4)	0.12 (3.0)	13/16	15/16	
9/16	SS-940-6	3.69 (93.7)	1.45 (36.8)	0.19 (4.8)	1 1/4	1 3/8	

### Reducing Unions



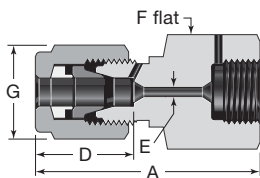
Tube OD, in.		Ordering Number	Dimensions, in. (mm)							Pressure Rating psig (bar)
T	Tx		A	D	Dx	E	F	G	Gx	
3/8	1/4	SS-640-6-440	2.61 (66.3)	1.04 (26.4)	0.82 (20.8)	0.09 (2.3)	13/16	15/16	3/4	60 000 (4134)
9/16	1/4	SS-940-6-440	3.22 (81.8)	1.45 (36.8)	0.82 (20.8)	0.09 (2.3)	1 1/4	1 3/8	3/4	
	3/8	SS-940-6-640	3.42 (86.9)		1.04 (26.4)	0.12 (3.0)			15/16	

### Bulkhead Unions



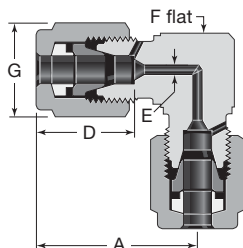
Tube OD in.	Ordering Number	Dimensions in. (mm)					Hole Drill Size	Panel Thickness Max in. (mm)	Pressure Rating psig (bar)
		A	D	E	F	G			
1/4	SS-440-61	3.30 (83.8)	0.82 (20.8)	0.09 (2.3)	15/16	3/4	0.78 (19.8)	0.50 (12.7)	60 000 (4134)
3/8	SS-640-61	3.72 (94.5)	1.04 (26.4)	0.12 (3.0)	1 1/16	15/16	0.91 (23.1)		
9/16	SS-940-61	5.07 (129)	1.45 (36.8)	0.19 (4.8)	1 5/8	1 3/8	1.34 (34.0)		

### High-Pressure Tube Fitting to High-Pressure Female Thread Connectors



Tube OD in.	Uniform Thread Size	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
			A	D	E	F	G	
1/4	9/16-18	SS-440-7-44F	1.87 (47.5)	0.82 (20.8)	0.09 (2.3)	7/8	3/4	60 000 (4134)
3/8	3/4-16	SS-640-7-64F	2.26 (57.4)	1.04 (26.4)	0.12 (3.0)	1 1/8	15/16	
9/16	1 1/8-12	SS-940-7-94F	3.13 (79.5)	1.45 (36.8)	0.19 (4.8)	1 3/8	1 3/8	

### Union Elbows

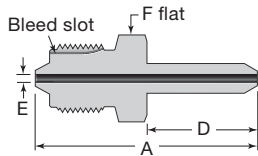


Tube OD in.	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
		A	D	E	F	G	
1/4	SS-440-9	1.39 (35.3)	0.82 (20.8)	0.09 (2.3)	11/16	3/4	60 000 (4134)
3/8	SS-640-9	1.74 (44.2)	1.04 (26.4)	0.12 (3.0)	7/8	15/16	
9/16	SS-940-9	2.52 (64.0)	1.45 (36.8)	0.19 (4.8)	1 1/4	1 3/8	

## Ordering Information and Dimensions

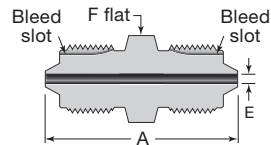
Dimensions are for reference only and are subject to change.

### High-Pressure Male Thread to Coned Tube Stub Adapters



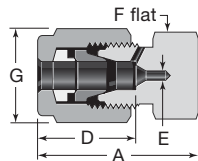
Tube OD in.	Uniform Thread Size	Ordering Number	Dimensions, in. (mm)				Pressure Rating psig (bar)
			A	D	E	F	
1/4	9/16-18	SS-44M-A-441	2.01 (51.1)	1.00 (25.4)	0.06 (1.5)	5/8	60 000 (4134)
3/8	3/4-16	SS-64M-A-641	2.47 (62.7)	1.25 (31.8)	0.12 (3.0)	13/16	60 000 (4134)
9/16	1 1/8-12	SS-94M-A-941	3.34 (84.8)	1.76 (44.7)	0.19 (4.8)	1 1/4	45 000 (3100)

### High-Pressure Male Thread Unions



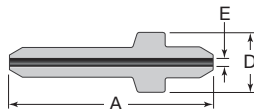
Uniform Thread Size	Ordering Number	Dimensions, in. (mm)			Pressure Rating psig (bar)
		A	E	F	
9/16-18	SS-44M-6	1.71 (43.4)	0.09 (2.3)	5/8	60 000 (4134)

### Caps



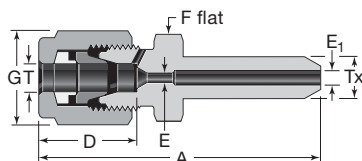
Tube OD in.	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
		A	D	E	F	G	
1/4	SS-440-C	1.35 (34.3)	0.82 (20.8)	0.09 (2.3)	5/8	3/4	60 000 (4134)
3/8	SS-640-C	1.80 (45.7)	1.04 (26.4)	0.12 (3.0)	13/16	15/16	
9/16	SS-940-C	2.52 (64.0)	1.45 (36.8)	0.19 (4.8)	1 1/4	1 3/8	

### Port Connectors



Tube OD in.	Ordering Number	Dimensions, in. (mm)			Pressure Rating psig (bar)
		A	D	E	
1/4	SS-441-PC	1.85 (47.0)	0.50 (12.7)	0.06 (1.5)	60 000 (4134)
3/8	SS-641-PC	2.33 (59.2)	0.68 (17.3)	0.12 (3.0)	60 000 (4134)
9/16	SS-941-PC	3.41 (86.6)	1.06 (26.9)	0.19 (4.8)	45 000 (3100)

### High-Pressure Tube Fitting to Coned Tube Stub Reducers

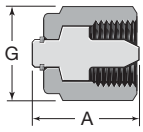


Tube OD, in.		Ordering Number	Dimensions, in. (mm)						Pressure Rating psig (bar)
T	Tx		A	D	E	E <sub>1</sub>	F	G	
1/4	3/8	SS-440-R-641	2.53 (64.3)	0.82 (20.8)	0.09 (2.3)	0.12 (3.0)	5/8	3/4	60 000 (4134)
3/8	9/16	SS-640-R-941	3.28 (83.3)	1.04 (26.4)	0.12 (3.0)	0.19 (4.8)	13/16	15/16	45 000 (3100)
9/16	3/8	SS-940-R-641	3.31 (84.1)	1.45 (36.8)	0.19 (4.8)	0.12 (3.0)	1 1/4	1 3/8	60 000 (4134)

## Ordering Information and Dimensions

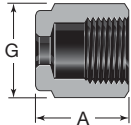
Dimensions are for reference only and are subject to change.

### Plugs



Tube OD in.	Ordering Number	Dimensions, in. (mm)		Pressure Rating psig (bar)
		A	G	
1/4	SS-440-P	0.95 (24.1)	3/4	60 000 (4134)
3/8	SS-640-P	1.18 (30.0)	15/16	
9/16	SS-940-P	1.66 (42.2)	1 3/8	

### Nuts



Tube OD in.	Ordering Number	Dimensions in. (mm)	
		A	G
1/4	SS-442-1	0.81 (20.6)	3/4
3/8	SS-642-1	0.97 (24.6)	15/16
9/16	SS-942-1	1.44 (36.6)	1 3/8

### Front Ferrules



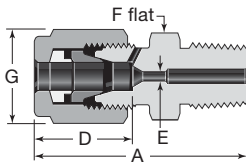
Tube OD in.	Ordering Number
1/4	SS-443-1
3/8	SS-643-1
9/16	SS-943-1

### Back Ferrules



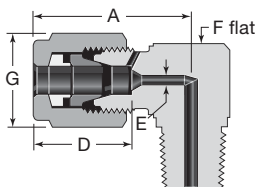
Tube OD in.	Ordering Number
1/4	174PH-444-1
3/8	174PH-644-1
9/16	174PH-944-1

### High-Pressure Tube Fitting to Male Pipe Thread Connectors



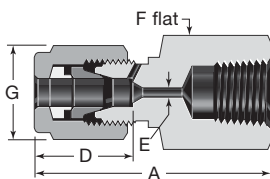
Tube OD in.	Male NPT Size in.	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
			A	D	E	F	G	
1/4	1/4	SS-440-1-4	1.84 (46.7)	0.82 (20.8)	0.09 (2.3)	5/8	3/4	30 000 (2067)
3/8	3/8	SS-640-1-6	2.09 (53.1)	1.04 (26.4)	0.12 (3.0)	13/16	15/16	
9/16	1/2	SS-940-1-8	2.80 (71.1)	1.45 (36.8)	0.19 (4.8)	1 1/4	1 3/8	

### High-Pressure Tube Fitting to Male Pipe Thread Elbows



Tube OD in.	Male NPT Size in.	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
			A	D	E	F	G	
1/4	1/4	SS-440-2-4	1.50 (38.1)	0.82 (20.8)	0.09 (2.3)	7/8	3/4	30 000 (2067)
3/8	3/8	SS-640-2-6	1.74 (44.2)	1.04 (26.4)	0.12 (3.0)	7/8	15/16	
9/16	1/2	SS-940-2-8	2.52 (64.0)	1.45 (36.8)	0.19 (4.8)	1 1/4	1 3/8	

### High-Pressure Tube Fitting to Female Pipe Thread Connectors

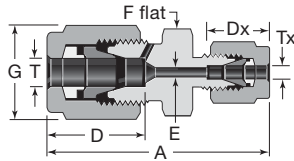


Tube OD in.	Female NPT Size in.	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
			A	D	E	F	G	
1/4	1/4	SS-440-7-4	2.07 (52.6)	0.82 (20.8)	0.09 (2.3)	7/8	3/4	20 000 (1378)
3/8	3/8	SS-640-7-6	2.36 (59.9)	1.04 (26.4)	0.12 (3.0)	1	15/16	
9/16	1/2	SS-940-7-8	2.99 (75.9)	1.45 (36.8)	0.19 (4.8)	1 1/4	1 3/8	

## Ordering Information and Dimensions

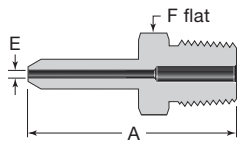
Dimensions are for reference only and are subject to change.

### High-Pressure Tube Fitting to Swagelok Tube Fitting Unions



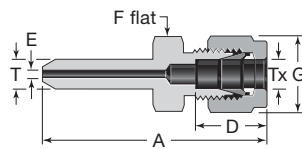
Tube OD, in.		Ordering Number	Dimensions, in. (mm)						Pressure Rating psig (bar)
T	Tx		A	D	Dx	E	F	G	
1/4	1/8	SS-440-6-200	1.88 (47.8)	0.82 (20.8)	0.50 (12.7)	0.09 (2.3)	5/8	3/4	10 900 (751)
3/8	1/4	SS-640-6-400	2.21 (56.1)	1.04 (26.4)	0.60 (15.2)	0.12 (3.0)	13/16	15/16	10 200 (702)
9/16	3/8	SS-940-6-600	2.80 (71.1)	1.45 (36.8)	0.66 (16.8)	0.19 (4.8)	1 1/4	1 3/8	7 500 (516)

### Coned Tube Stub to Male Pipe Thread Adapters



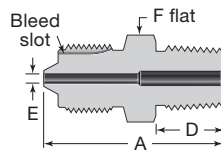
Tube OD in.	Male NPT Size in.	Ordering Number	Dimensions, in. (mm)			Pressure Rating psig (bar)
			A	E	F	
1/4	1/4	SS-441-A-4	1.84 (46.7)	0.06 (1.5)	9/16	30 000 (2067)
3/8	3/8	SS-641-A-6	2.12 (53.8)	0.12 (3.0)	11/16	
9/16	1/2	SS-941-A-8	2.85 (72.4)	0.19 (4.8)	7/8	

### Coned Tube Stub to Swagelok Tube Fitting Adapters



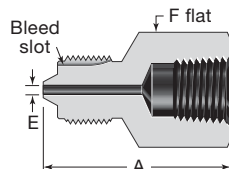
Tube OD, in.		Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
T	Tx		A	D	E	F	G	
1/4	1/4	SS-441-A-400	1.97 (50.0)	0.60 (15.2)	0.06 (1.5)	1/2	9/16	10 200 (702)
3/8	3/8	SS-641-A-600	2.31 (58.7)	0.66 (16.8)	0.12 (3.0)	5/8	11/16	7 500 (516)
9/16	1/2	SS-941-A-810	2.96 (75.2)	0.90 (22.9)	0.19 (4.8)	13/16	7/8	6 700 (461)

### High-Pressure Male Thread to Male Pipe Connectors



Thread Size	Male NPT Size in.	Ordering Number	Dimensions, in. (mm)				Pressure Rating psig (bar)
			A	D	E	F	
9/16-18	1/4	SS-44M-1-4	1.55 (39.4)	0.56 (14.2)	0.09 (2.3)	5/8	30 000 (2067)
3/4-16	3/8	SS-64M-1-6	1.78 (45.2)	0.56 (14.2)	0.12 (3.0)	13/16	
1 1/8-12	1/2	SS-94M-1-8	2.30 (58.4)	0.75 (19.0)	0.19 (4.8)	1 1/4	

### High-Pressure Male Thread to Female Pipe Connectors

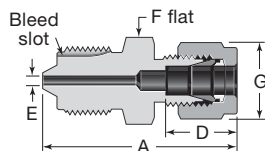


Thread Size	Female NPT Size in.	Ordering Number	Dimensions, in. (mm)			Pressure Rating psig (bar)
			A	E	F	
9/16-18	1/4	SS-44M-7-4	1.66 (42.2)	0.09 (2.3)	7/8	20 000 (1378)
3/4-16	3/8	SS-64M-7-6	1.94 (49.3)	0.12 (3.0)	1	
1 1/8-12	1/2	SS-94M-7-8	2.48 (63.0)	0.19 (4.8)	1 1/4	

## Ordering Information and Dimensions

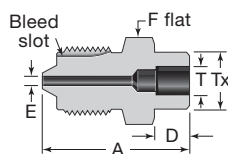
Dimensions are for reference only and are subject to change.

### High-Pressure Male Thread to Swagelok Tube Fitting Adapters



Tube OD in.	Thread Size	Ordering Number	Dimensions, in. (mm)					Pressure Rating psig (bar)
			A	D	E	F	G	
1/8	9/16-18	SS-44M-A-200	1.61 (40.8)	0.50 (12.7)	0.09 (2.3)	5/8	7/16	10 900 (751)
1/4	9/16-18	SS-44M-A-400	1.70 (43.1)	0.60 (15.2)	0.09 (2.3)	5/8	9/16	10 200 (702)
3/8	3/4-16	SS-64M-A-600	1.97 (50.0)	0.66 (16.7)	0.12 (3.0)	13/16	11/16	7 500 (516)
1/2	1 1/8-12	SS-94M-A-810	2.41 (61.2)	0.90 (22.9)	0.19 (4.8)	1 1/4	7/8	6 700 (461)

### High-Pressure Male Thread to Tube Socket Weld Adapters



Tube OD, in.		Thread Size	Ordering Number	Dimensions, in. (mm)				Pressure Rating psig (bar)
T	Tx			A	D	E	F	
1/4	1/2	9/16-18	SS-44M-A-4TSW	1.30 (33.0)	0.28 (7.1)	0.09 (2.3)	5/8	20 000 (1378)
3/8	5/8	3/4-16	SS-64M-A-6TSW	1.60 (40.6)	0.31 (7.9)	0.12 (3.0)	13/16	20 000 (1378)
1/2	3/4	1 1/8-12	SS-94M-A-8TSW	1.99 (50.5)	0.38 (9.7)	0.19 (4.8)	1 1/4	15 000 (1033)

## Instructions for High-Pressure Cone and Ferrule Tube Fittings

### Installation—Hardened Tubing

**⚠ The pre-setting tool (see page 8) must be used for proper initial installation of high-pressure tube fittings with hardened tubing.**

1. Install the nut and ferrules onto the pre-setting tool.
2. Insert the coned tubing into the pre-setting tool.
3. Make sure that the tubing rests firmly on the tapered shoulder of the pre-setting tool body.
4. Tighten the nut until the tubing cannot be turned by hand.
5. Scribe the nut at the 6 o'clock position.
6. While holding the pre-setting tool steady, tighten the nut one and one-fourth turns to the 9 o'clock position.
7. Loosen the nut and remove the tubing with pre-set ferrules from the pre-setting tool.
8. Insert tubing with pre-set ferrules into the fitting body until the front ferrule seats.
9. Make sure that the nut is finger-tight.
10. While holding fitting body steady with a backup wrench, tighten the nut three-eighths turn for 3/8 and 9/16 in. tubing and one-fourth turn for 1/4 in. tubing.

### Installation—Annealed Tubing

The pre-setting tool is suggested for proper installation of high-pressure tube fittings with annealed tubing. When the pre-setting tool is used, use the instructions for hardened tubing. When the pre-setting tool is not used, use the following instructions:

1. Insert coned tubing into the tube fitting.
2. Make sure that the tubing rests firmly on the tapered shoulder of the tube fitting body.
3. Tighten the nut until the tubing cannot be turned by hand.
4. Scribe the nut at the 6 o'clock position.
5. While holding fitting body steady with a backup wrench, tighten the nut one and one-fourth turns to the 9 o'clock position.

### Installation—High-Pressure Male and Female Threads

1. Make sure that the nut is finger-tight.
2. Tighten the nut one-eighth turn.

### Reassembly Instructions

You may disassemble and reassemble a Swagelok high-pressure tube fitting.

1. Insert tubing with pre-set ferrules into the fitting body until the front ferrule seats.
2. Make sure that the nut is finger-tight.
3. While holding fitting body steady with a backup wrench, tighten the nut three-eighths turn for 3/8 and 9/16 in. tubing and one-fourth turn for 1/4 in. tubing.



## Options and Accessories

### Pre-Setting Tool

The pre-setting tool is suggested for initial assembly of Swagelok high-pressure tube fittings when used with annealed tubing. The pre-setting tool **must** be used for initial assembly of these tube fittings when used with Swagelok hardened tubing.



Tube OD/ Tool Size, in.	Ordering Number	Minimum OD Required, in.
1/4	MS-440-PT	0.250
3/8	MS-640-PT	0.375
9/16	MS-940-PT	0.562

For tubing tolerance requirements, contact your authorized Swagelok sales and service representative.

### Coning Tool

High-pressure tubing used with Swagelok high-pressure tube fittings should be prepared with a Swagelok coning tool. The Swagelok coning tool cuts a smooth, concentric cone on the tube end to help ensure reliable sealing in the fitting body. It is designed to prepare 1/4, 3/8, and 9/16 in. outside diameter heavy wall tubing.



Each coning tool comes in a carrying case with Rapid Tap™ cutting lubricant; 1/4, 3/8, and 9/16 in. collets and tool bits; and inside-diameter deburring tool.

Ordering number: **MS-469-CT**

For operating instructions, see the *Coning Tool User's Manual*, MS-CRD-CONING.

### Replacement Parts

To order additional items separately, select an ordering number.

Description	Ordering Number
Cutting lubricant	MS-469CT-LUBE
1/4 in. collet	MS-469CT-2-4
1/4 in. tool bit	MS-469CT-7-4
3/8 in. collet	MS-469CT-2-6
3/8 in. tool bit	MS-469CT-7-6
9/16 in. collet	MS-469CT-2-9
9/16 in. tool bit	MS-469CT-7-9
Deburring tool	MS-44CT-27

#### Safe Product Selection

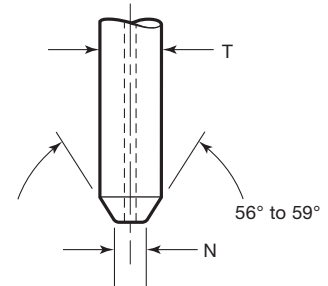
**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

**Caution: Do not mix or interchange parts with those of other manufacturers.**

### Visual Tube Inspection

- A proper cone has ends that are faced and smooth.
- The cone should be free of any scratches and leave-off marks.

Tube Preparation	
T, in.	N, in.
1/4	1/8
3/8	7/32
9/16	9/32



### Pre-Coned Tubing

Pre-coned tube lengths of hardened or annealed tubing are available from 2 to 120 in. (5 to 305 cm) in length. Tube lengths are precisely coned with a high-quality finish. Annealed tubing is rated to 30 000 psig (2067 bar). Hardened tubing is rated to 60 000 psig (4134 bar).

Tube OD in.	Length in. (cm)	Ordering Numbers		Wall Thickness in. (mm)
		Hardened Tubing	Annealed Tubing	
1/4	2 (5.0)	SS-483-T-2	SS-483-A-2	0.083 (2.1)
	4 (10.2)	SS-483-T-4	SS-483-A-4	
	8 (20.3)	SS-483-T-8	SS-483-A-8	
	12 (30.5)	SS-483-T-12	SS-483-A-12	0.095 (2.4)
	4 (10.2)	SS-495-T-4	SS-495-A-4	
	8 (20.3)	SS-495-T-8	SS-495-A-8	
3/8	12 (30.5)	SS-495-T-12	SS-495-A-12	0.125 (3.2)
	3 (7.6)	SS-612-T-3	SS-612-A-3	
	4 (10.2)	SS-612-T-4	SS-612-A-4	
	8 (20.3)	SS-612-T-8	SS-612-A-8	
9/16	12 (30.5)	SS-612-T-12	SS-612-A-12	0.187 (4.7)
	4 (10.2)	SS-918-T-4	SS-918-A-4	
	8 (20.3)	SS-918-T-8	SS-918-A-8	
	12 (30.5)	SS-918-T-12	SS-918-A-12	

Dimensions are for reference only and are subject to change.

### Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit [swagelok.com](http://swagelok.com) or contact your authorized Swagelok representative.